REMARKS

The invention relates to a device and method for use of this device to manipulate substantially non-magnetic particles dispersed inside a magnetic fluid by employing a changeable pattern of local magnetic field maxima and minima.

Claims 1-8, 10-18 are pending in the application. Claims 15-17 have been withdrawn from consideration as being drawn to a non-elected invention. Therefore claims 1-8, 10-14 and 18 are currently under consideration. Claims 1 and 18 have been amended.

Claim Amendments

Claim 1 has been amended to specifically recite that at least one of said non-magnetic particles is not attached to said magnetic particles, at least one of said sources of magnetic fields comprises an array of magnetizable features on a micrometer or nanometer length scale, and at least one of said sources of magnetic fields comprises a time-varying magnetic field supplied by a source held external to said fluid holding chamber. Support for this amendment is found at least in paragraphs [0029], [0030], [0037] and [0041] of corresponding U.S. Patent Application Publication No. 2007/0215553.

Claim 18 has been amended to specifically recite that at least one of said non-magnetic particles is not attached to said magnetic particles and at least one of said sources of magnetic fields comprises a time-varying magnetic field supplied by a source held external to said fluid holding chamber. Support for this amendment is found at least in paragraphs [0037] and [0041] of corresponding U.S. Patent Application Publication No. 2007/0215553.

Therefore, no new matter has been added by way of these amendments.

Rejection of claims 1-8, 10-14, and 18 pursuant to 35 U.S.C. §102(b)

The Examiner has rejected claims 1-8, 10-14, and 18 under 35 U.S.C. § 102(b) as being anticipated by Prentiss et al. (U.S. Appl. Pub. No. 2002/0166760, hereinafter "Prentiss"). Specifically, the Examiner alleges that Prentiss teaches a device comprising a fluid holding chamber, a fluid in contact the inner surface of the chamber containing a dispersion of magnetic and non-magnetic particles and at least two sources of magnetic fields positioned in close proximity to or inside of the chamber which produce a changeable pattern of magnetic field minima and maxima regions thereby causing the non-magnetic particles in the fluid to be

transported towards the magnetic field minima regions by magnetic force, wherein one of said sources of magnetic fields comprises an array of magnetizable features on a micrometer or nanometer length scale. The Examiner further alleges that Prentiss also teaches a device comprising a fluid holding chamber, a fluid in contact the inner surface of the chamber containing a dispersion of magnetic and non-magnetic particles and at least two sources of magnetic fields positioned in close proximity to or inside of the chamber wherein at least one of said sources of magnetic fields is positioned inside the fluid holding chamber. Therefore, the Examiner contends that Prentiss anticipates the presently claimed invention. Applicants do not agree with the Examiner for the following reasons.

It is hornbook law that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP §2131 (quoting *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Id.* (quoting *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). Therefore, Prentiss must describe each and every element of the claims in order to anticipate these claims under 35 U.S.C. §102(b). This reference does not satisfy this requirement.

The present invention is based on the development of a device for manipulating ***non-magnetic*** particles dispersed inside a magnetic fluid by employing a changeable pattern of local magnetic field maxima and minima. The device can efficiently program the movement of fluids near surfaces simultaneously over large areas on a microscopic scale. One important structural feature of the claimed device is that at least one of the magnetic field sources comprises a time-varying magnetic field supplied by a source held external to the fluid holding chamber. Examples of time-varying magnetic fields include oscillating or rotating magnetic fields. When the time-varying external magnetic field continuously and simultaneously magnetizes the magnetic particles of the fluid and the magnetic features, the magnetic particles of the fluid are pushed in pursuit of the magnetic field *maxima* region, while non-magnetic particles are moved to *opposite areas* in pursuit of the region of magnetic field *minima*. This indirect movement of the non-magnetic particles is due to the effective diamagnetic force induced by the fluid acquiring a net magnetization caused by the presence of a substantial volume fraction of magnetic particles. The manipulation of non-magnetic particles is thus

achieved without being attached to a magnetic particle. That is, motions of the magnetic particles are used to indirectly manipulate the desired configurations of non-magnetic particles whereby the non-magnetic particles move in the opposite direct from the magnetic particles.

In an earnest effort to advance prosecution of the claims, Applicants have amended the claims 1 and 18 to specifically recite that at least one of said non-magnetic particles is not attached to said magnetic particles and at least one of said sources of magnetic fields comprises a time-varying magnetic field supplied by a source held external to said fluid holding chamber.

Prentiss teaches an apparatus for manipulating non-magnetic biological or chemical species. However, these non-magnetic species are required to be attached to a magnetic particle in order for them to be manipulated by way of micro-magnetic fields. Prentiss teaches that since the magnetic particles transport to the magnetic field maxima region, the result is that the non-magnetic species that are attached to the magnetic particles are also transported to the magnetic field maxima region along with the magnetic particles. This requirement of having the non-magnetic biological/chemical species be attached to the magnetic particle is distinct from the presently claimed invention which is directed to manipulating movement of non-magnetic particles that are not attached to a magnetic particle. A consequence of having the non-magnetic particle be attached to the magnetic particle is that the non-magnetic particle is transported to the maxima region which is contrary to the claimed invention of causing the non-magnetic particles in the fluid to be transported towards the magnetic field minima.

Even if the non-magnetic species are not attached to the magnetic particle as in Example 4 of Prentiss, this reference does not teach that the non-magnetic species are transported towards the magnetic field minima regions. At best, Prentiss teaches that magnetic beads are separated from a solution containing both magnetic and non-magnetic beads. Only the magnetic beads were manipulated and therefore, the non-magnetic particles stayed in the suspension and at no time are the non-magnetic particles transported to the magnetic field minima. This is clearly distinct from the amended claims of the present invention which comprises at least two sources of magnetic fields causing the non-magnetic particles in the fluid to be transported towards the magnetic field minima.

In addition, Prentiss further teaches that the magnetic field is generated by passing current through wires formed on a substrate as illustrated in Figures 1-4 and paragraph [0038] of

Prentiss. Wires may be formed on a substrate in any variety of patterns and the particular pattern may be designed for the desired application. However, these wires are all attached inside of the substrate, which is distinct from the time-varying magnetic field held external of the substrate/fluid holding chamber.

Furthermore, although Prentiss may teach that the device may contain a possible external magnetic field (e.g, paragraph [0044]), Prentiss does not teach a time-varying external magnetic field and the magnetic field which attracts the particles within the channel. Rather, Prentiss, teaches that both magnetic fields generated by current carrying wires and external magnetic fields may be used as indicated in [0039] and [0052]. However, nowhere does Prentiss specifically teach a time-varying external magnetic field for generating a changeable pattern of magnetic field minima and maxima regions thereby causing the non-magnetic particles in the fluid to be transported towards the magnetic field minima regions as instantly claimed.

Applicants respectfully submit that claims 1-8, 10-14 and claim 18 are not anticipated by Prentiss for the reasons set forth above, and request reconsideration and withdrawal of the rejection pursuant to 35 U.S.C. §102(b).

Summary

Early consideration and allowance of the claims in the present application is requested at the earliest possible time.

Respectfully submitted,

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Date

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